Tiva Based Daughter Board for Firebird V Hardware And Software Manual.

eRTS Lab IIT Bombay

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1 Credits

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Documentation Author(Alphabetical Order):

1. Ayush Gaurav, Intern eYSIP 2017
2. Nagesh K, Intern eYSIP 2017

Credits(Alphabetical Order):

1. Prof Kavi Arya, CSE IIT Bombay
2. Nex Robotics Pvt. Ltd.
3. Piyush Manavar, Team e-Yantra

2 Notice

The contents of this manual are subject to change without notice. All efforts have been made to ensure the accuracy of contents in this manual. However, should any errors be detected, e-yantra welcomes your corrections. You can send us your queries / suggestions at Contact Us

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6 Software Manual:

6.1 Code Composer Studio:

Code Composer Studio is an integrated development environment (IDE) that supports TI's Microcontroller and Embedded Processors portfolio. Code Composer Studio comprises a suite of tools used to develop and debug embedded applications. It includes an optimizing C/C++ compiler, source code editor, project build environment, debugger, profiler, and many other features. The intuitive IDE provides a single user interface taking you through each step of the application development flow. Familiar tools and interfaces allow users to get started faster than ever before. Code Composer Studio combines the advantages of the Eclipse software framework with advanced embedded debug capabilities from TI resulting in a compelling feature-rich development environment for embedded developers. This description is directly taken from the website of Texas Instruments and click to know more about CC Studio

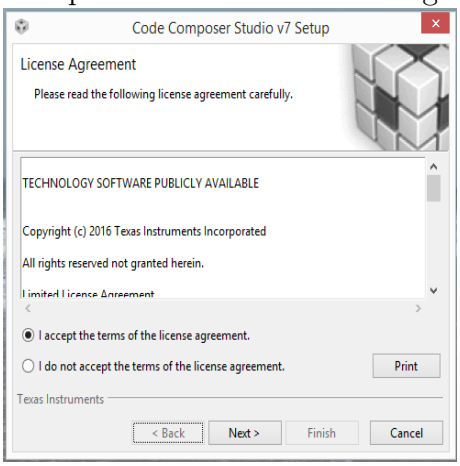
6.1.1 Download CC Studio:

At the time of writing this document Version 7 was the latest one. You can check for the latest at Download CCS.(do not download any beta versions).There will be two installer files.The web installer will require Internet access until it completes. If the web installer version is unavailable or you can't get it to work, download, unzip and run the offline version. The offline download will be much larger than the installed size of CCS since it includes all the possible supported hardware.

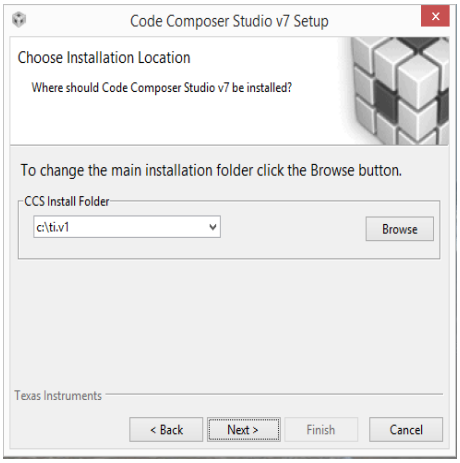
6.1.2 Installing C C Studio:

After the installer has started follow the steps mentioned below:

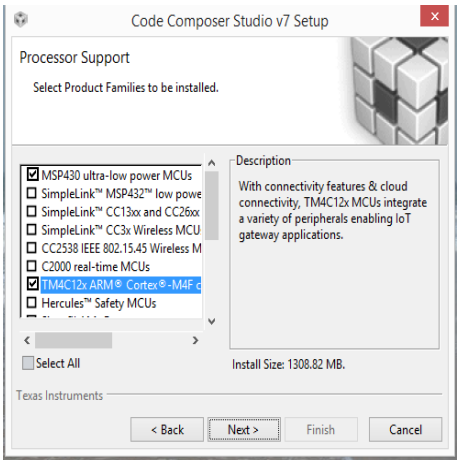
1. Accept the Software License Agreement and click Next.



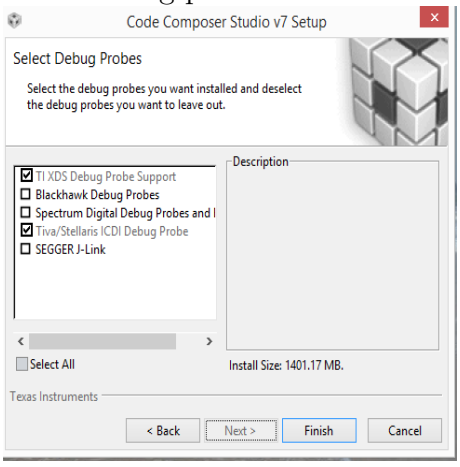
2. Select the destination folder and click next.



3. Select the processors that your CCS installation will support. You must select "TM4C12X Arm Cortex M4". You can select other architectures, but the installation time and size will increase.



4. Select debug probes and click finish



5. The installer process should take 15 - 30 minutes, depending on the speed of your connection. The offline installation should take 10 to 15 minutes. When the installation is complete, uncheck the "Launch Code Composer Studio v7" checkbox and then click Finish.There are several additional tools that require installation during the CCS install process. Click "Yes" or "OK" to proceed when these appear.

6. Install TivaWare for C Series (Complete). Download and install the latest full version of TivaWare from: TivaWare. The filename is SW-TM4C-x.x.exe . This workshop was built using version 1.1. Your version may be a later one. If at all possible, please install TivaWare into the default location.

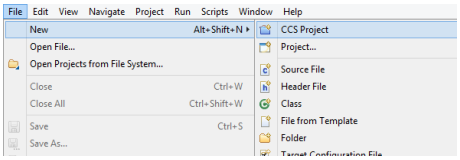
You can find additional information at these websites:
Main page: www.ti.com/launchpad
Tiva C Series TM4C123G LaunchPad:
http://www.ti.com/tool/ek-tm4c123gxl
TM4C123GH6PM folder:
http://www.ti.com/product/tm4c123gh6pm
BoosterPack webpage: www.ti.com/boosterpack
LaunchPad Wiki:
www.ti.com/launchpadwiki

For understanding the launchpad properly and to learn more about Tiva it is strongly recommended to go through the webpage TIva Worshops and download and read the workbook

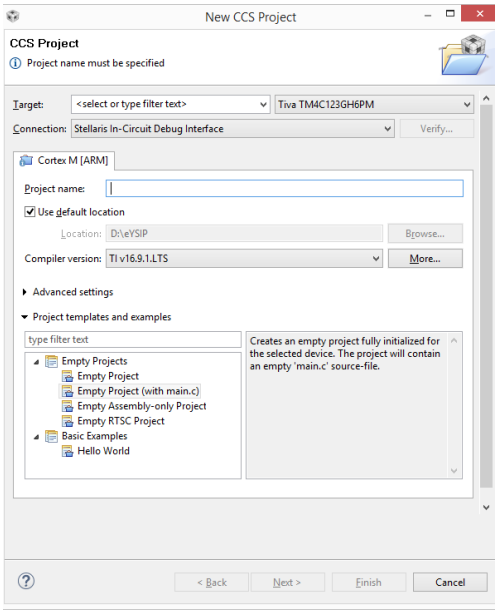
6.1.3 Create a New Project

To create new project follow the steps mentioned:

1. Click File then New and then CCS Projects



2. Select Target and connection as shown in the photo. Give a name to your project and save in a location.Click Finish. A main.c file will be open



6.1.4 Add Path and Build Variables

The path and build variables are used for:

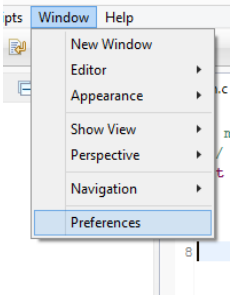
- Path variable – when you ADD (link) a file to your project, you can specify a "relative to" path. The default is PROJECT_LOC which means that your linked resource (like a .lib file) will be linked relative to your project directory.
- Build variable – used for items such as the search path for include files associated with a library – i.e. it is used when you build your project.

Variables can either have a PROJECT scope (that they only work for this project) or a WORKSPACE scope (that they work across all projects in the workspace). In the next step, we need to add (link) a library file and then add a search path for include files. First, we'll add these variables MANUALLY as WORKSPACE variables so that any project in your workspace can use the variables. Refer to the workbook by TI for adding as PROJECT

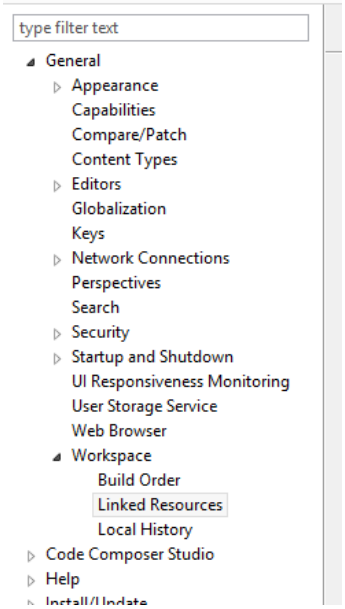
6.1.4.1 Adding a Path Variable

To add a path variable,:

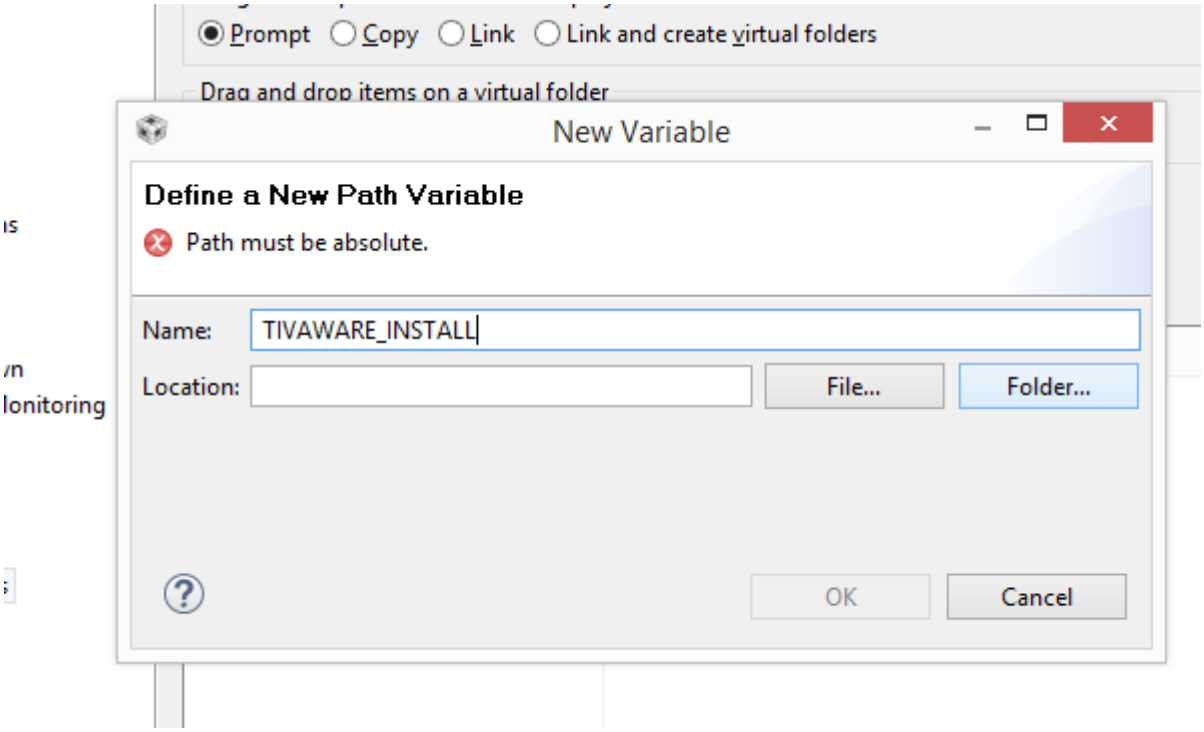
- Right-click on your Window Tab and select Preference.



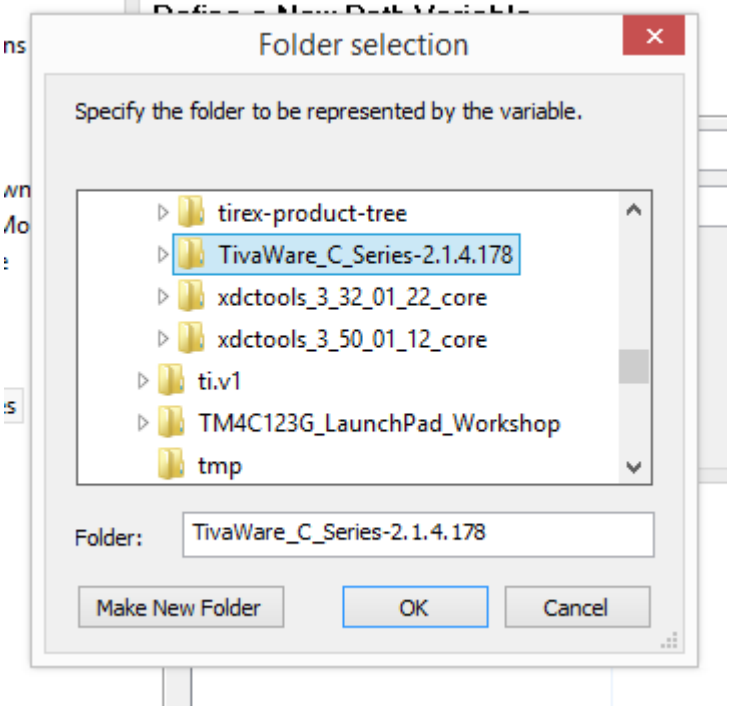
- Expand General list in the upper left-hand corner as shown and then expand the Resource list and click on Linked Resources: We want to add a New variable to specify exactly where you installed TivaWare.

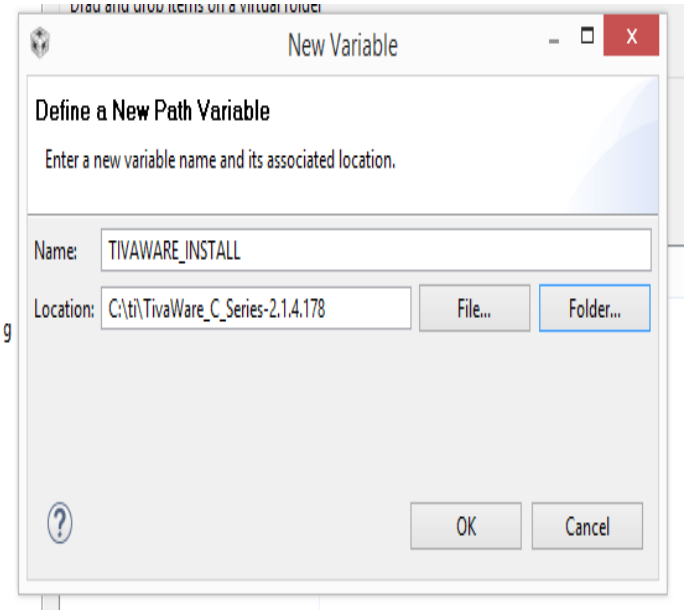


- Click New
- When the New Variable dialog appears, type TIVAWARE_INSTALL for the name.

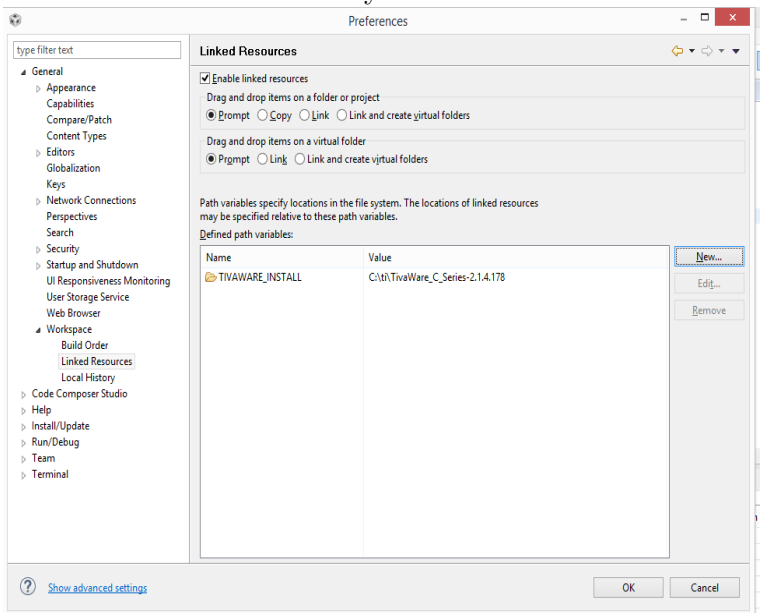


- For the Location, click the Folder... button and navigate to your TivaWare installation. Click on the folder name and then click OK.





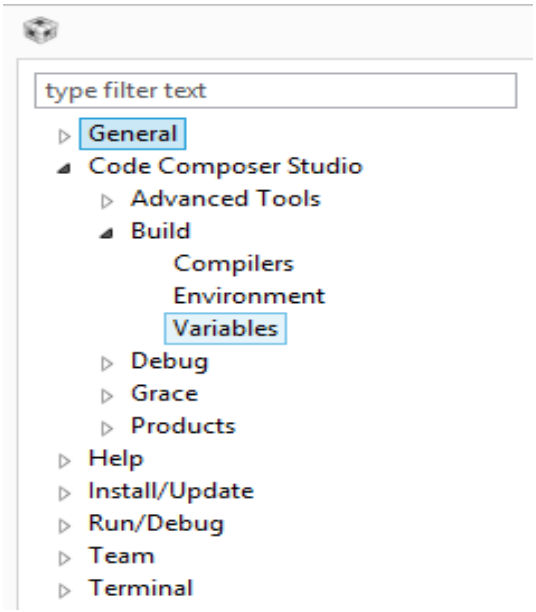
- Click OK. You should see your new variable listed in the Variables list.



6.1.4.2 Adding a Build Variable

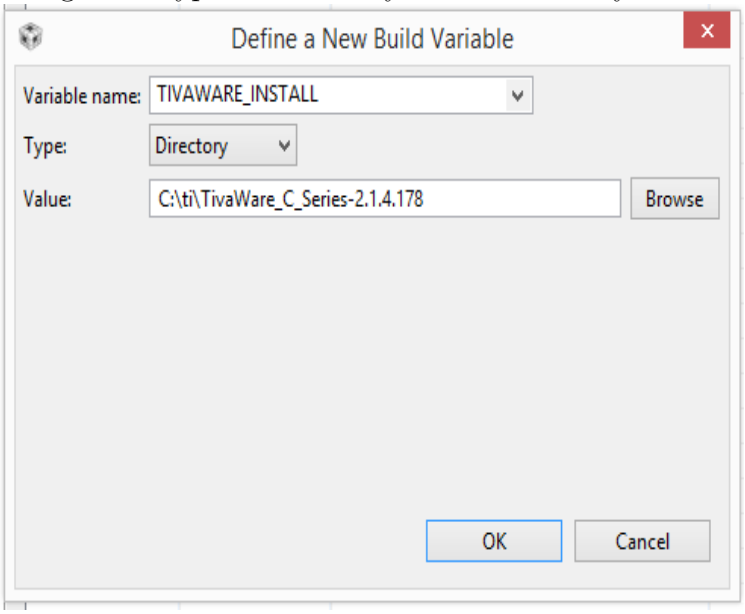
Now let's add a build variable that we will use in the include search path for the INCLUDE files associated with the TivaWare driver libraries.

- Click on Code Composer Studio Build and then the Variables tab:

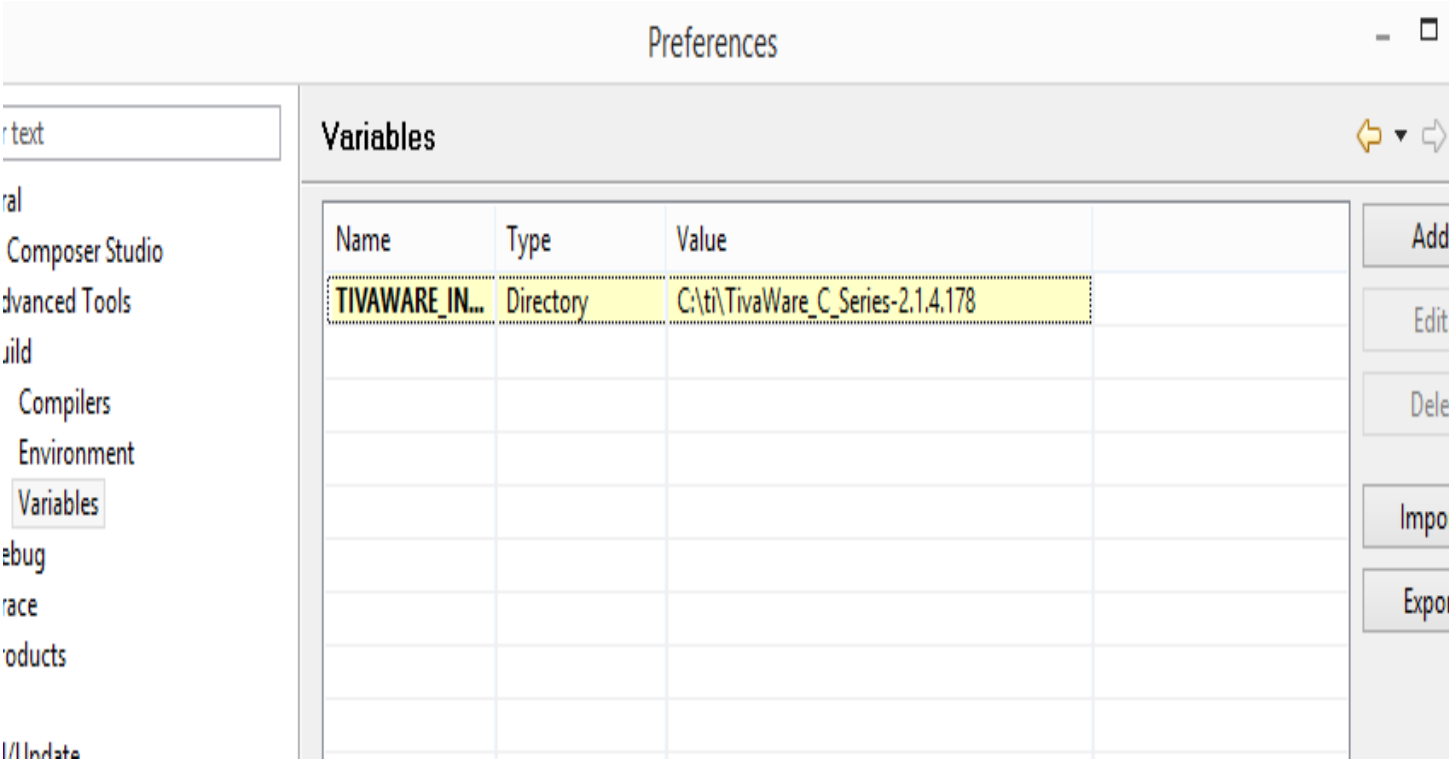


- Click the Add button. When the Define a New Build Variable dialog appears, insert TIVAWARE_INSTALL into the Variables name box.

- Change the Type to Directory and browse to your Tivaware installation folder.



- Click OK.
- Click OK again to save and close the Build Properties window.



6.2 driver.lib

6.3 Buzzer

Located in the folder "Buzzer_Beep" folder in the documentation. In this example, we will load buzzer beep code in Tiva based Fire Bird V. Now we will see in detail the structure of this code.This experiment demonstrates the simple operation of Buzzer ON/OFF with one some delay. Buzzer is connected to PORTF 4 pin of the Tiva Launchpad. If you have uC based board then it is connected to PORTA 2. Concepts covered: Output operation, generating delay Note: Make sure that you have included driver.lib // Buzzer is connected at PF4/PA2 on Tiva launchPad/uC // To turn it on make PF4/PA2 pin logic 1

6.4 **Programming the Robot**
6.5 **Using Debugger of The Programmer**
6.6 **Simple I/O Operation**
6.7 **Robot Direction Control**
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